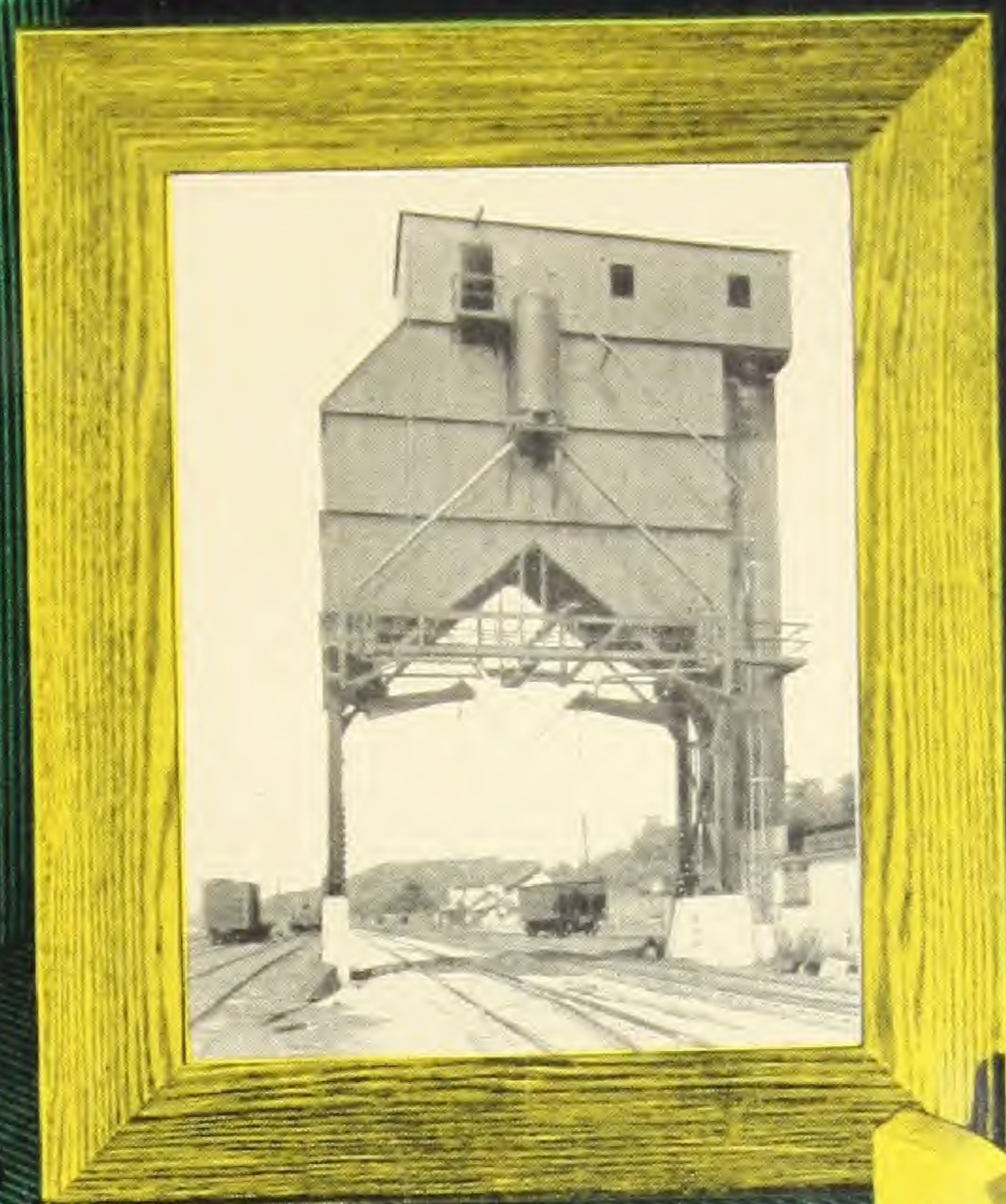


1071-10.



**GENUINE BYERS
WROUGHT IRON
PLATES**

A.M. BYERS COMPANY

PITTSBURGH

PENNSYLVANIA

BOSTON

CHICAGO

HOUSTON

NEW YORK

PHILADELPHIA

ST. LOUIS

WASHINGTON

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CCA

BYERS
GENUINE WROUGHT IRON
PLATES & SHEETS



A. M. BYERS COMPANY
PITTSBURGH, PENNSYLVANIA

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BYERS GENUINE WROUGHT IRON PLATES & SHEETS

TODAY *initial* cost of materials is being swept aside in favor of *lowest annual cost*. The past few years have brought to industry a staggering maintenance bill that is resulting in a careful study of materials toward the achievement of lower yearly costs.

Every engineer knows that in addition to the cost of plates and sheets on a mill or warehouse floor there must be added transportation, fabrication and overhead. On most construction work in which plates or sheets are involved the material alone is usually less than half the cost of the completed, ready-to-operate installation. The difference in cost of the complete installation, therefore, is increased but a small percentage when the most suitable materials are specified as opposed to those which cost the least initially.

There are many different metals from which the engineer may make his selection. It should be remembered that the very general term "iron" originated with genuine wrought iron, and wrought iron today still qualifies under every known definition applied to that term. It is also



(5)—Byers Wrought Iron plates were used for the coal bins, chutes and hoppers in this locomotive coaling station built in 1933 by the Missouri Pacific Railroad at Myrick, Mo.



(6)—The roof of this "run-down" tank, which is in service at one of the large Texas oil refineries, was fabricated from Byers Galvanized Wrought Iron sheets.



(6)—Gas collection hoods made of Byers galvanized sheets ready for installation in the settling tanks at the Sewage Disposal Plant, South Haven, Mich.



(5)—All-welded smoke duct, made of Byers Wrought Iron plates, recently installed in a roundhouse of the C. M. St. P. & P. R. R., at Chicago.

well to remember that wrought iron possesses characteristics found in no other ferrous metal. In outward appearance only does it resemble some of the other metals commonly grouped with it. In their standard definition of terms the American Society for Testing Materials defines wrought iron as follows:

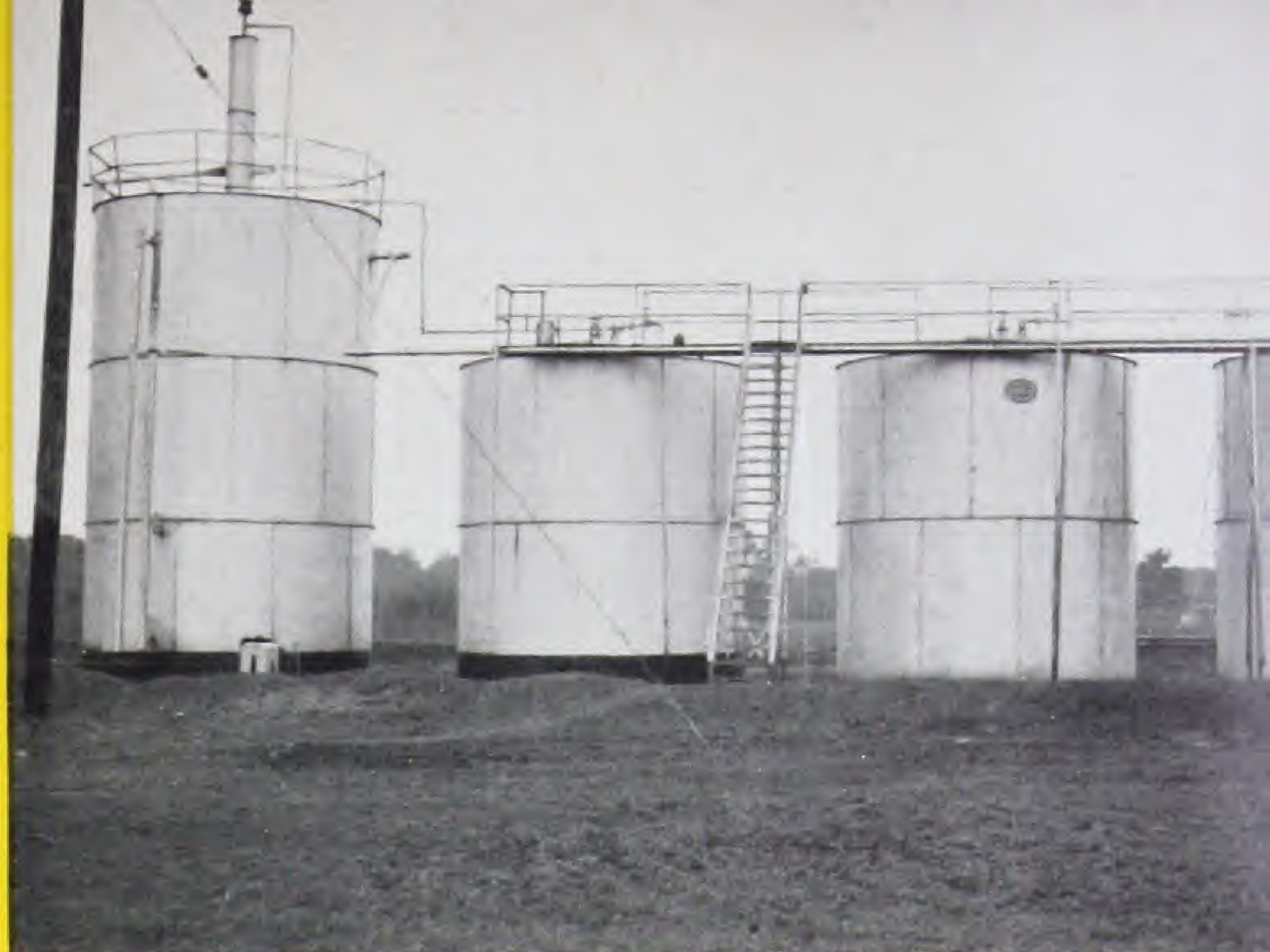
"Wrought Iron—A ferrous material aggregated from a solidifying mass of pasty particles of highly refined metallic iron with which, without subsequent fusion, is incorporated a minutely and uniformly distributed quantity of slag."

In other words, genuine wrought iron is an intimate physical mixture of two components: namely, (1) a high purity iron base metal, and (2) iron silicate or "slag," as it is generally known. The slag content is distributed throughout the refined iron in the form of threads or fibres which extend in the direction of rolling. These non-rusting, glass-like slag fibres give wrought iron a structure very similar to that of a tough fibrous wood. When a piece of wrought iron is fractured its

peculiar fibrous structure is most apparent. All other ferrous metals when fractured reveal a granular or crystalline structure.

For a period of about twenty-five years, prior to 1930, Genuine Wrought Iron in the form of Plates and Sheets was not commercially available because of the inherent limitations in the production methods employed. Within the past ten years, however, developments and improvements made by A. M. Byers Company in the art of manufacturing genuine wrought iron coupled with the installation of modern rolling equipment have made it possible for the company to reintroduce plates and sheets for the many services where genuine wrought iron has proved to be the most economical metal available.

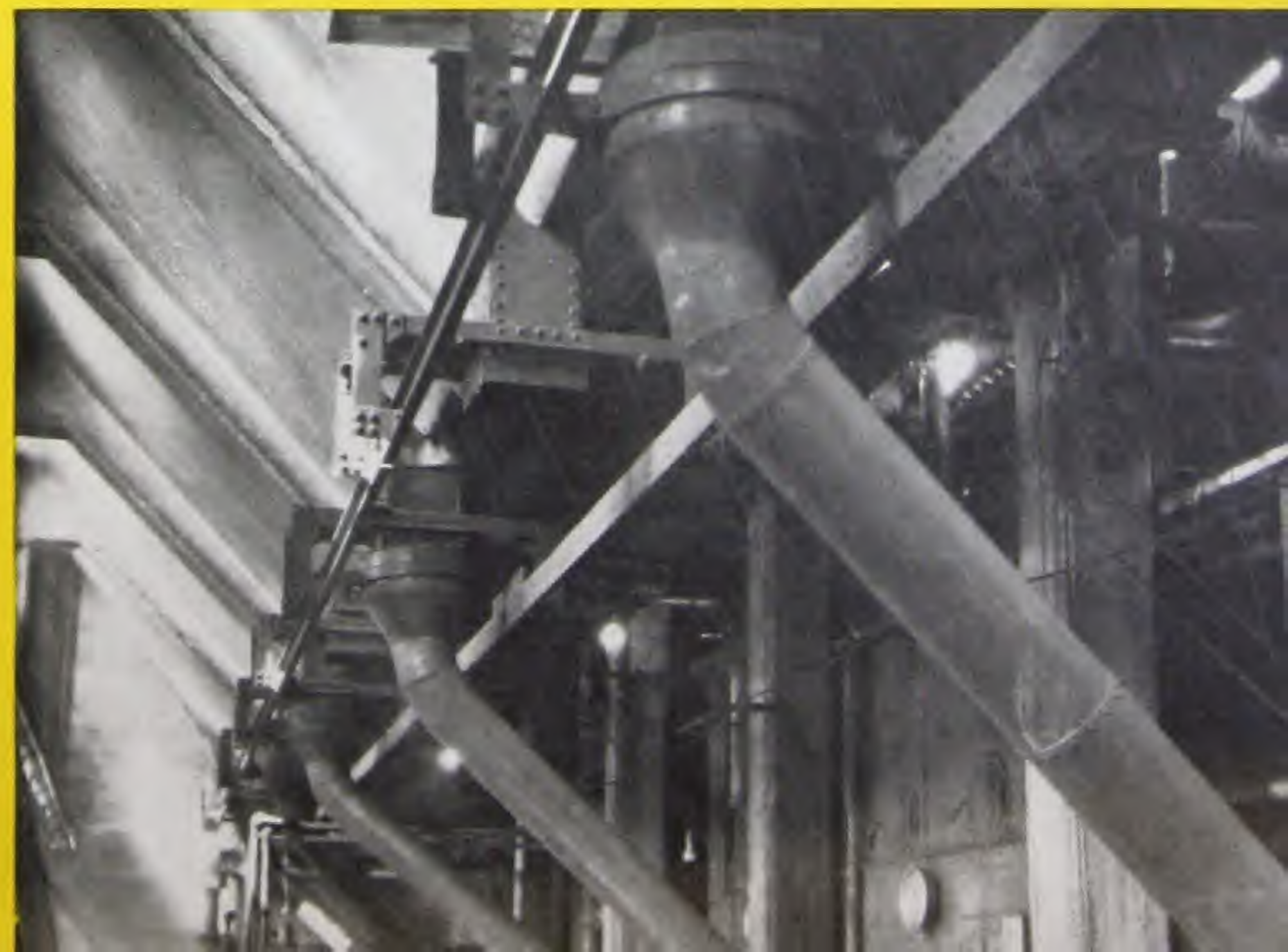
Although genuine wrought iron is the oldest of the ferrous metals there was a time, not so many years ago, when it seemed that the newer metals were going to replace it in a majority of the services for which it had proved most satisfac-



(6)—Lease tanks made of Byers Wrought Iron plates installed by a large oil company at one of their Gulf Coast fields.



(2 & 4)—Byers Wrought Iron plate pipe, sizes 14" to 54" O. D. was installed the latter part of 1933 at the Fleischmann Yeast Plant of Standard Brands, Inc., Peekskill, N. Y., for air process piping, river water supply and return lines and cold city water lines.



(5)—Coal chutes made of Byers plates in service at the Oconomowoc, Wis., plant of the Carnation Company.



(2 & 4)—The 24" O.D. water line on the South Tenth Street Bridge over the Monongahela River, Pittsburgh, was fabricated from Byers plates by electric welding.



(5)—Boiler breeching and coal chute, made of Byers plates, installed at the Coshocton, Ohio, plant of the Carnation Company.

tory. Today, however, industry is finding an increasing number of services where genuine wrought iron alone or in combination with other metals permit a balanced design that assures maximum life at low yearly cost.

Genuine wrought iron possesses two virtues of interest to every engineer: (1) An exceptional resistance to most types of corrosion, and (2) the ability to resist fracture from fatigue caused by vibration. Both these virtues are the result of combining a metallic iron of high purity with non-rusting slag. The proof of these statements will be found in the many older ships, bridges, smoke stacks, tanks and underground pipe lines still in use. The service records of these old installations can not be duplicated by any other ductile ferrous metal.

In order to indicate some of the services for which genuine wrought iron plates and sheets are being used a number of photographs illustrating several different types of installations have been included in this bulletin. It will be observed from

the photographs that while the corrosive conditions to which the installations are subjected vary somewhat, they can all be grouped under a relatively few general classes.

Experience indicates that for all practical purposes the various types of corrosion to which a majority of installations are subjected may be grouped under a small number of broad general classifications. These are listed as follows:

1. SOIL

There are many types of soils and their corrosive action on underground metal structures varies from comparatively mild to very severe. Service data clearly indicate that of the commonly used ductile ferrous metals genuine wrought iron is the most satisfactory to withstand the various degrees of soil corrosion.

2. SUBMERGED

This covers all installations in the various types of fresh water where the metal surfaces are continually wet. Obviously,



(5)—The shell of this water gas generator at the Kearny, New Jersey, plant of the Public Service Electric & Gas Company was made of Byers Wrought Iron plates.



(5)—Both of these welded smoke stacks at the plant of the West Bend Aluminum Co., West Bend, Wis., are made of Byers Wrought Iron plates.



(3)—The casings protecting the metal columns which support South Boston's Marine Park Pier are of Byers Wrought Iron plates.



(4)—Fuse box cabinets made of Byers sheets at the Rath Packing Company plant, Waterloo, Ia.



(2 & 4)—One of the butterfly valves made of Byers Wrought Iron plates, bars and angles recently installed by the U. S. Engineers in Lock No. 2, Allegheny River.

the severity of corrosive conditions varies widely, depending largely upon the type of water, but, on the average, genuine wrought iron can be expected to last longer and therefore cost less per year than any of the other commonly used ductile ferrous metals.

3. SALT WATER AND BRINE

This classification encompasses all service conditions where salt and its aqueous solutions are encountered. Engineering records definitely indicate that for installations subjected to such conditions, particularly where

(6)—All welded wort tank of Byers Wrought Iron plates recently placed in service by the Croft Brewing Company, Roxbury, Mass.



(3)—The entire hull of the U. S. Public Health Service tug "T. B. McClintic," designed by P. W. Clark, naval architect, was made of Byers Wrought Iron plates.



(5)—Fabricating all-welded smoke jacks from Byers plates for installation in a Chicago roundhouse of the C. M. St. P. & P. R. R.





(2 & 4)—The hull of this derrick boat, built for the U. S. Engineers, Huntington, W. Va., is made of Byers Wrought Iron Plates.



(1 & 2)—24" O.D. water well casing made of Byers plates recently installed in a well by the City of Madison, Wis.



(3 & 4)—Byers plates were used on a section of the P. B. R. elevated freight line, West Philadelphia, to replace top cover plates that had been weakened due to corrosion.

long life is desirable, genuine wrought iron has no superior among any of the commonly used ferrous metals.

4. ATMOSPHERIC

Atmospheric corrosion subjects the metal surfaces to a wide variety of conditions ranging from very mild to very severe. It includes normal dry atmospheres, industrial and salt-laden atmospheres, and alternating wet and dry conditions. The value of genuine wrought iron is ordinarily more easily observed in installations where the more severe conditions prevail.

(1 & 4)—Elevated water tank made of Byers plates for the City of Libertyville, Ill.

(3 & 4)—Byers plates were installed on this C. R. I. & P. R. R. bridge, Booneville, Ia., to protect the top flanges of the floor beams from further corrosion by brine drippings.



(4)—Milwaukee Harbor Commission transit shed on which Byers Galvanized Wrought Iron sheets were used for roofing, siding, ventilators and flashing.





(4 & 5)—The underside of the Park Street Bridge, Akron, Ohio, crossing over Pennsylvania, Erie and Baltimore & Ohio railroad tracks, is protected from corrosive locomotive gases with Byers Wrought Iron plates.



(2 & 4)—The flap type submergible gate of the Marmet roller type dam in the Kanawha River near Charleston, W. Va., was fabricated from Byers Wrought Iron plates and structurals.



(3 & 4)—A typical view of the fire curtains and sprinkler lines recently installed on Pennsylvania Railroad Piers Nos. 27, 28 and 29, North River, New York City. Both the plates and the pipe were of Byers Wrought Iron.

5. COAL, AND THE PRODUCTS OF COMBUSTION

Although this is a somewhat special classification it covers a number of services, such as coal and ash handling equipment, smoke stacks, breechings, flues, blast plates, smoke jacks and ducts, where the corrosive influences are all due to the same sources. It also includes installations designed to carry the products of combustion of oil and gas fuels. Records on installations of genuine wrought iron in this type service definitely point out that it has no superior among the ferrous metals ordinarily used.

6. PROCESSING SOLUTIONS, FUMES AND VAPORS OF VARIOUS TYPES

Because of the wide variation in the corrosive effect of processing or chemical solutions, fumes and vapors on ferrous metals, it is impossible to even attempt to make general statements regarding material selection. In each case there is more or less of an individual problem



(6)—Beer cooling tank welded from Byers Wrought Iron plates in 1933 for Liebmann Breweries, Inc., Brooklyn, N. Y.



(1)—Underground oil storage tank fabricated by welding from Byers plates for a large industrial plant.

and material selection must be made according to the corrosive conditions and other limiting factors encountered in the particular installation. For those installations, however, where the more widely used ferrous metals can be considered genuine wrought iron can be relied upon to give most satisfactory service.

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As a matter of interest the installations of genuine wrought iron plates and sheets shown in the photographs have been assigned a number indicating the general classification under which the type or types of corrosion encountered will fall. Obviously, some of the installations will be subjected to corrosive influences that come under two or more classifications and in such cases more than one number has been assigned to the photograph.

In addition to corrosion and vibration fatigue resistance genuine wrought iron has certain other inherent characteristics which enhance its desirability for many uses. One of these is its superior welda-



(3 & 4)—The ballast troughs on the C. M. St. P. & P. R. R. bridge over Fond du Lac Avenue, Milwaukee, were made of Byers Wrought Iron plates and angles.

bility, a quality due principally to the presence of the slag which is an excellent flux.

Another most important characteristic of genuine wrought iron is its ability to take on a heavier and more adherent coating, such as galvanizing, than other metals. The reason for this is that when the metal is pickled in acid the iron on the surface is eaten away leaving the slag fibres unaffected. This produces a relatively rough surface which provides a good anchorage for the coating.

Genuine wrought iron is also easy to machine or forge. Due to the presence of the slag fibres a machined surface will ordinarily be slightly rougher than that of metals having a granular or crystalline structure.

In some instances a loosely phrased specification permits of either wilful or unintentional substitution of some other metal for a service where the specifier intended wrought iron should be used.

Many engineers are overcoming this hazard by specifying the material as "genuine wrought iron" and in many cases as "wrought iron as manufactured by A. M. Byers Company."

Whenever possible it is suggested that use be made of specifications sponsored by recognized engineering bodies, such as A.S.T.M., or the Federal Specifications Board. For example, in drawing up specifications involving genuine wrought iron plates, many large users state that the plates shall be furnished in accordance with the latest revision of A.S.T.M. Standard Specifications for Wrought Iron Plates—A.S.T.M. Designation A 42. This is an excellent specification and its use will assure the purchaser of receiving only the highest quality material.

Space does not permit a detailed discussion or photographs of all the services for which Byers Wrought Iron Plates and Sheets are now being used, but where there is an obvious need of a more lasting material than that now being used let us help you investigate the possibilities of genuine wrought iron before you complete your specification. A. M. Byers Company offers without cost or obligation the services of their Engineering Service Department, a division of the company established for the purpose of studying practical field applications of wrought iron. The reference library of the Engineering Service Department is believed to be the largest collection of data on wrought iron in existence.

Whether you write or telephone a distributor of Byers plates, the nearest Byers division office or the Engineering Service Department, A. M. Byers Company, Pittsburgh, Pa., your request will receive prompt attention.

(6)—Several of the twelve 7000 gallon yeast tubs fabricated by welding from Byers Wrought Iron plates ready for installation in the new distillery built by Hiram Walker, Gooderham & Worts, Ltd., of Canada, at Peoria, Illinois.



ROLLING LIMITS OF BYERS GENUINE WROUGHT IRON PLATES

**WEIGHT OF
WROUGHT
IRON PLATE
PER
SQUARE
FOOT**

STANDARD SHEARED PLATES

Thickness in Inches	Widths and Lengths in Inches									
	84	78	72	66	60	54	50	48	42	36
3/16	-----	-----	300	360	360	360	360	420	420	420
1/4	-----	300	300	360	360	420	420	420	480	480
5/16	300	300	300	360	420	420	420	480	480	480
3/8	300	360	360	360	420	420	420	480	480	480
7/16	240	240	280	300	300	300	300	360	360	360
1/2	240	280	300	300	300	300	300	300	300	300
9/16	240	280	280	280	280	280	280	280	280	280
5/8	240	240	240	240	240	240	240	240	240	240
11/16	216	216	216	216	216	216	216	216	216	216
3/4	192	192	192	192	192	192	192	192	192	192
7/8	168	168	168	168	168	168	168	168	168	168
1	144	144	144	144	144	144	144	144	144	144

EXTRA LONG SHEARED PLATES

(These special plates carry length extras and are suggested only where design limitation prohibits use of standard sheared plates.)

Thickness in Inches	Widths and Lengths in Inches										
	80	78	72	66	60	54	50	48	42	36	30
7/16	360	360	360	360	420	420	420	480	480	480	480
1/2	360	360	360	360	420	420	420	480	480	480	480
9/16	360	360	360	360	360	360	360	360	360	360	360
5/8	360	360	360	360	360	360	360	360	360	360	360
11/16	300	300	300	300	300	300	300	300	300	300	300
3/4	240	240	240	240	240	240	240	240	240	240	240
7/8	240	240	240	240	240	240	240	240	240	240	240
1	216	216	216	216	216	216	216	216	216	216	216

UNIVERSAL PLATES

SPECIAL FORMING PLATES

Thick- ness in Inches	Widths and Lengths in Inches						
	30/29	28/27	26/22	21/18	17/15	14/13	
5/8	720	720	720	720	720	720	(Widths and Thickness gauges same as those shown for Sheared Plates.) Maximum Lengths: 3% to 4% Transverse Elongation—216" 5% to 6% Transverse Elongation—168" 7% to 8% Transverse Elongation—120"
11/16	720	720	720	720	720	720	
3/4	660	660	660	720	720	720	
7/8	600	600	600	660	660	660	
1	540	540	540	600	600	600	

Thickness Pounds

3/16 7.50

1/4 10.00

5/16 12.50

3/8 15.00

7/16 17.50

1/2 20.00

9/16 22.50

5/8 25.00

11/16 27.50

3/4 30.00

13/16 32.50

7/8 35.00

15/16 37.50

1 40.00

All Byers Genuine Wrought Iron Plates are furnished to thickness gauge only and the allowable tolerances are governed by "Manufacturer's Standard Practice". Plates can be furnished to closer tolerances for which standard extras apply.

Base Price and a card showing "Classification of Extras for Byers Genuine Wrought Iron Plates" may be secured from any Byers Sales Engineer or by writing direct to A. M. Byers Company, Pittsburgh, Pa.

Standard flanged and dished tank heads are available.

For estimating purposes the weight of genuine wrought iron may be taken as approximately 2% less than the weight of steel.

BYERS GENUINE WROUGHT IRON SHEETS

BLACK AND GALVANIZED

BLACK SHEETS—MAXIMUM SIZES

Blue Annealed Sheets

Widths		60	56	54	52	50	48 to 30	28	26	24
8 gauge.....	X	132	132	144	144	156	156	156	144	156
9 ".....	X	144	144	144	156	156	168	168	156	168
10 ".....	X	144	144	156	156	156	168	168	156	168
11 ".....	X	144	180	180	180	180	180	180	180	180
12 ".....	X	144	156	156	156	156	156	156	156	156
13 ".....	X	144	144	144	144	144	156	144	144	156
14 ".....	X	144	144	156	156	156	156	144	156	156
16 ".....	X	120	144	156	156	156	156	144	156	156

Hot Rolled Annealed Sheets

Widths		48 to 43	42 to 37	36 to 31	30 to 24
18-20 gauge.....	X	120	120	144	144
21-22 ".....	X	120	120	144	144
23-24 ".....	X	96	120	144	144
25-27 ".....	X	...	96	144	144
28 ".....	X	...	96	144	144

GALVANIZED SHEETS—MAXIMUM SIZES

Widths		48 to 43	42 to 37	36 to 31	30 to 24
10-14 gauge.....	X	144	144	144	144
15-16 ".....	X	144	144	144	144
17-20 ".....	X	120	120	144	144
21-22 ".....	X	120	120	144	144
23-24 ".....	X	...	120	120	144
25-26 ".....	X	...	96	120	144
27-28 ".....	X	120	144

Byers Genuine Wrought Iron Corrugated Roofing and Siding Sheets 16 to 28 gauge are available Black or Galvanized, with either 1¼, 2½ or 3 inch corrugations.

BYERS GENUINE WROUGHT IRON PRODUCTS

Plates

Sheets

Pipe

Structurals

Bar Iron

Rivets

Standard Flanged and Dished Tank Heads

Special Bending Pipe

Welding Fittings

Forging Billets

Culverts

A. M. BYERS COMPANY

PLANTS

Pittsburgh, Pennsylvania
6th and Bingham Streets

Ambridge
Beaver County, Pennsylvania

DIVISION OFFICES

Houston, Texas
Niels-Esperson Building

New York, N. Y.
30 Rockefeller Center

Philadelphia, Pa.
Morris Building

Boston, Mass.
Consolidated Building

Chicago, Ill.
Conway Building

Pittsburgh, Pa.
Clark Building

St. Louis, Mo.
Arcade Building

Washington, D. C.
Munsey Building

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